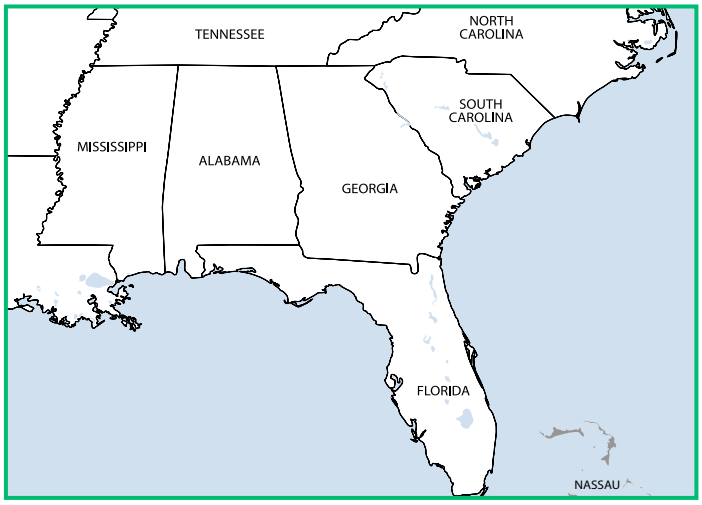
ARM Mobile Facility Leaving Alaska for U.S. Southeast

The Atmospheric Radiation Measurement (ARM) user facility will soon begin the process of moving its third mobile facility (AMF3) from Alaska to the Southeastern United States.

A workshop in August 2018 identified the Southeast as a priority region of interest for further study by ARM. The Southeast is a region with abundant atmospheric convection, yet the land surface, boundary layer, vegetation, and aerosol properties are markedly different from those seen at ARM's fixed observatory in Oklahoma, allowing opportunities to explore new research questions.

To maximize the scientific value of the new site, the U.S. Department of Energy's (DOE) Biological and Environmental Research program selected a site science team that will help guide the move of AMF3. Brookhaven National Laboratory (BNL) in New York will lead the AMF3 relocation effort. Supported by ARM and DOE's Atmospheric System Research (ASR), the multi-institutional team is responsible for developing a science plan and initial research project for the Southeastern U.S. deployment.

The site science team proposes to improve process understanding and model representations of aerosol, cloud, and land-atmosphere interactions, together with key cross-coupling of those areas to explore land-atmosphere feedbacks and aerosol-cloud interactions.



The Southeastern United States experiences high humidity, frequent convection, and large amounts of natural emissions.

The third ARM Mobile Facility (AMF3) will soon end its extended deployment at Oliktok Point, Alaska, and move to the Southeastern United States. AMF3 has collected data at Oliktok Point since 2013.

Science Objectives

By the end of fiscal year 2021, AMF3 will cease operations at Oliktok Point, Alaska, where it has collected data since 2013. The Southeastern U.S. deployment is planned to start in the spring of 2023 and scheduled to last five years.

The site science team aims to facilitate and enable research that will be performed with the AMF3 data.

"We plan to work with the leadership of ARM, ASR, and other relevant agencies to host focused, strategic community workshops on scientific themes connected to the Southeastern United States," says BNL aerosol scientist Chongai Kuang, who leads the site science team.

Kuang says the team wants to put AMF3 in an area where the interactions between aerosol, convection, and land-atmosphere processes can be clearly and carefully studied.

"The processes that we're trying to study there are defined by the unique environment of the region, which is characterized by high humidity, frequent convection, and high biogenic emissions," he says.

Collaborations

When the call went out in 2019 for a national laboratory-led site science team, Kuang knew BNL had to respond because, he says, "it was right up our alley."

Researchers in BNL's Environmental and Climate Sciences Department study the topical areas that Kuang wanted to target in the proposal. The 10-person site science team includes three topical leads from BNL: Kuang (aerosols), Scott Giangrande (convective clouds), and Shawn Serbin (land-atmosphere interactions).

"We were very excited to be able to bring in expertise from land-atmosphere interactions," says Kuang. "It was the first time in our department where we were able to leverage that expertise."

From left to right, Shawn Serbin, Scott Giangrande, and Chongai Kuang, researchers at Brookhaven National Laboratory in New York, are the core leadership group and topical leads for the site science team that will help guide the AMF3 relocation effort.

Other members of the site science team are:

- Gregory Elsaesser, Goddard Institute for Space Studies, Columbia University/NASA
- Pierre Gentine, Columbia University
- Thijs Heus, Cleveland State University
- Mariko Oue, Stony Brook University
- John Peters, Naval Postgraduate School
- James Smith, University of California, Irvine
- Allison Steiner, University of Michigan.

The Southeastern United States, with its abundant atmospheric convection, will open new opportunities for research and collaboration. Photo is courtesy of NOAA.

With feedback from the scientific community in mind, the group will help pinpoint potential destinations for AMF3 and identify collaborators in the region. Team members will work closely with ARM leadership and Sandia National Laboratories in New Mexico. Sandia will continue to manage AMF3 after it heads to the Southeast.

During the June 2021 Joint ARM User Facility/ASR Principal Investigators Meeting, the BNL-led site science team expects to present high-level science drivers, updates to timelines, and science-driven siting criteria and instrument justifications. The team also plans to solicit community feedback during the meeting, and it will continue to communicate project updates through the ARM and ASR newsletters.

"A goal of this project is to really engage with the broader scientific community and the public," says Kuang. "Our plan is to identify some potential regions, but then also engage with and gather feedback from the broader scientific community in order to build wide-ranging interest in the deployment."

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https://www.arm.gov/capabilities/observatories/amf/locations/seus

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